THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume XVII | JANUARY, 1944 | No. 1

Officers and Executives of A.S.M.'s New Tulsa Chapter

Key Men in the New Tulsa Chapter of the A.S.M. Are, Left to Right: Executive Committee Members Jack Thompson, Dale Hall and Walter O'Bannon, Jr., Vice-Chairman Tom Tweedie of Douglas Aircraft Corp., Secretary-Treasurer Vince Barth, Also of Douglas, Executive Committee Members Bill Ducker and Wayne Hunt, and Chapter Chairman P. L. Wilson of Spartan Aircraft Co.

Engineers' Duties Involve Industrial Relations

—Reama

Reported by Walter M. Saunders, Jr.
Consulting Metallurgist

Rhode Island Chapter—A double feature (but without dishes or silverware) drew a goodly audience on Nov. 3. The A.S.M. film "Metal Crystals" was one of the features, and the other was a straight-from-the-shoulder talk on "The Engineer's Duties and Responsibilities in Methods and Human Engineering," by George H. Reama, factory manager and director of labor relations, American Screw Co., Providence.

A tool maker and machinist by trade, Mr. Reama is ex-president of the Industrial Relations Association of Rhode Island, and industry member of War Labor Board No. 1 for the New England Region.

Human Engineering Lags

In the past, machine and product engineering did a great job, but human engineering did not keep pace. Selling and advertising efforts carried these two divisions about 20 years ahead of human engineering and social economics. There are two factors in selling—to create desire to purchase, and to have the means to do so.

In the past, only about 50% of the necessary purchasing power was available. Increases in wages, and decreases in costs and selling prices, can furnish purchasing power. It is the engineer's responsibility to decrease costs, and we must have product and methods engineering that will do all this.

The real "forgotten man" is the one willing to invest in projects that will create jobs. No clauses in any labor agreement ever considered the stockholder.

It is a mistake to look on labor as a commodity, and we must pro-

(Continued on page 3, column 4)

—V—

Usability and Future of Various Plastics Shown

—Witt

Reported by Emil Gathmann, Jr.
Chief Engineer, Gathmann Engineering Co.

Baltimore Chapter—A most informative paper on plastics and metals was delivered before a joint meeting with the Baltimore Chapter of the American Society of Mechanical Engineers on Nov. 15. Ralph K. Witt, associate in the department of chemical engineering, The Johns Hopkins University, and director of research in laminated phenolics for the National Manufacturers Association, was the speaker.

Dr. Witt discussed at length the usability and future of the various types of plastics—phenolic laminates, molding materials and casting materials—their part in the war effort, and particularly their uses in the aircraft industry.

He pointed out the advantages and disadvantages of plastics as compared to metals and emphasized the importance of not losing sight of the fact that plastics have certain limitations that metals do not

(Continued on page 7, column 1)

Time & Age Hardening (Mostly of Aluminum)

—Van Horn

Reported by J. B. Caine
Metallurgist, Sawbrook Steel Castings Co.

Cincinnati Chapter—Double features always draw, even for technical subjects, as witnessed by the capacity crowd that turned out at National Officers' and Sustaining Members' meeting, to hear Bill Eisenman on his farm and Kent Van Horn on aluminum.

Kent has the honor of being the first speaker to attract metalmissies as well as metallurgists to our meetings. The well-known refining influence of the gentler sex was apparent immediately.

Kent has started what is going to be a new high level of visual presentation of a technical subject. All he needs to do now, if the present trend in metallurgical personnel continues, is to develop a Sinatra delivery and we'll hire a hall!

All Transactions Cards Will Be Honored

Postal cards requesting receipt of the bound volumes of Transactions will still be honored if they are sent now to the National Office. These cards carried an expiration date of Dec. 15, but because of the Christmas mail congestion, many were not delivered until after that date.

Members may therefore disregard this time limit and still mail in their request cards.

Full Bibliography On NE Steels in This Issue of Review

A complete bibliography of the National Emergency Steels covering the years 1942 and 1943 has been prepared under the auspices of the American Society for Metals and is published on pages 4 and 5 of this issue of The Review.

Much has been written and published about these new steels and yet the need for this published information remains acute. It was deemed, therefore, that such bibliography would be a valuable addition to the libraries of A.S.M. members, many of whom have been responsible in large measure for the development of these steels. Those who are not so familiar with them but still have occasion to use or fabricate them should find this bibliography a useful source of information on all aspects of the subject of NE steels.

Proper "Impurities" May Enhance Physicals Of Aluminum Alloys

—Bonsack

Reported by Stewart M. DePoy
Metallurgist, Delco Products Div., G.M.C.

Dayton Chapter — The technical session on Nov. 10 was highlighted by an informative lecture by Walter Bonsack on "The Effects of Minor Alloying Elements in Aluminum". Mr. Bonsack is director of laboratories at the National Smelting Co., and was awarded the 1943 Dudley Medal of the American Society for Testing Materials.

Curves that were developed by Mr. Bonsack revealed both the good and bad effects of very small amounts of iron, silicon, manganese, chromium, copper, tin and titanium. In the past, industry has always thought of impurities as a detriment to aluminum casting. It is now evident that the proper "impurities" in the proper amounts are actually alloying elements which enhance the physical properties of the metal quite appreciably.

Mr. Bonsack answered many questions from the floor, and many problems concerning aluminum castings will now be erased in Dayton.

Preceding the technical session a technicolor travelogue of Ecuador was shown.

—V—

The NE steels have now reached an estimated annual tonnage of 4,250,000 in two years' time.

Shows Effect Of Cold Drawing On Properties

—Landis

Reported by Paul F. Ulmer
Metallurgist, Link Belt Co.

Indianapolis Chapter—"Predicting Engineering Properties of Steel From Cold Finishing Methods and Jominy Tests" was expounded by Henry N. Landis, assistant manager of metallurgical engineering, La Salle Steel Co., at the November meeting.

Mr. Landis first illustrated the variation in physical properties to be expected from segregation in the ingot and from production practice at different mills. Since the increase in tensile strength and yield point by cold drawing is additive, a high strength hot rolled bar will have higher strength after cold drawing than a bar having low ultimate strength.

Hardness Relation Not Effective

Mr. Landis cautioned not to use the empirical relation of 500 × Brinell hardness = tensile strength on cold drawn steel. The yield point is much nearer the ultimate strength and is not so pronounced in cold drawn steel.

Another fact not commonly understood is that rod 2½ in. up is turned and polished and thus has the same properties as the bar it is made from.

Cold drawn bars are drawn through a die and not rolled as the common term "cold rolled" would indicate. The bar is undersize as it comes through the die, and increases to the desired size when it goes through the straightener.

Furnace treatment after cold drawing will equalize the variations in tensile strength present in the hot rolled bar markedly. Strains from drawing and straightening are reduced so that a part machined from this stock is more likely to be uniform dimensionally.

The part of Mr. Landis's talk dealing with Jominy tests has been covered by other reports.

Microscope Solves Metal Mysteries

—Brick

Reported by H. C. Amtsberg
Westinghouse Electric & Mfg. Co.

Pittsburgh Chapter—A capacity crowd at Young Fellows' Night on Nov. 11 was treated to a discussion of several interesting case histories in a talk entitled "Quick Watson, the Micro" by R. M. Brick, physical metallurgist, Yale University. Dr. Brick is author of "Structure and Properties of Alloys" and holder of the Institute of Metals award.

Machining Difficulties Solved

In his first example of the use of the microscope in solving perplexing metallurgical problems, Dr. Brick showed, on a manganese steel, *(a)* that an improperly annealed structure was the cause for machining difficulties and *(b)* that a serious error had been made in the carbon determination of the chemical analysis check.

In his second case, a couple of simple heat treatments followed by micro-examination proved that the steel in question was of the correct composition but that edge crumbling of the aircraft clutch parts made thereof was caused by a night-turn heat treater having quenched the parts from a high speed salt bath at 1800° F. instead of using a regular salt bath at 1550°.

Dry-Ice Treatment Needed

The third Sherlock Holmes study proved both interesting and complex. Initial micro-examination showed that rings made from a 0.5% carbon, 7% tungsten, 7% chromium steel had been overheated as a result of a bad thermocouple. This

(Continued on page 3, column 1)

—V—

Gives General Survey Of Aircraft Engines

—Hanink

Reported by Lyle McNitt
Plant Mgr., American Porcelain Enamel Co.

West Michigan Chapter—a general survey of aircraft engine design and operating conditions and their effect on metallurgical practices introduced an address on "Aircraft Metallurgy" by Herman H. Hanink, laboratory supervisor of Wright Aeronautical Corp.

Mr. Hanink then enumerated the materials used for major engine parts, and reasons for their selection, and gave a brief description of recent changes in materials resulting from conservation measures.

Discussing the processing of these materials, he told about heat treating practices and controls, electroplating, oxide and phosphate coatings, anodizing, dichromating, and impregnation.

Inspection procedures, including X-ray, Magnaflux and "black light" inspection, were also informatively presented.

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Comment from the Press

On The National Metal Congress & Display

RANKING as the greatest gathering of technical men from the metal industries in the world, the National Metal Congress has become a very good barometer of general conditions and of technical progress in the field of metallurgy. The recent Congress in Chicago reflected the excellent manufacturing job which is being done in the United States and Canada in the production of all sorts of war devices from the simplest part to the most complex assembly. Allowing all due credit to the efficiency and effectiveness of modern machining operations, the observer at the Congress could not help noting how futile are the results of mechanical operations upon metals unless the inherent metallurgical and physical properties are there to begin with and unless heat treatment and all other supplementary metallurgical operations are properly applied and controlled in the production of a finished part with all the qualities required. . . .

The regular technical papers presented at the Congress were of the highest quality and some of the off-the-record group meetings on production, conservation and post-war planning brought forth worthwhile contributions. . . .

The attendance of over 100 Canadians at the meeting indicated the esteem in which the Congress is held by metallurgists and production men in this country. However, it was recognized that 100 Canadians very easily became lost among 10,000 Americans and the suggestion was made at the Canadian luncheon that there should be a special Canadian room at the convention where Canadians could assemble with some certainty of finding people whom they would know.

Canadian Metals and Metallurgical Industries, November, 1943

—V—

THE 25th National Metal Congress, October 18-22, differed from its predecessors in that the elaborate showmanship of exhibit booths gave way to an almost puritanical simplicity in the War Conference Displays in sample rooms on three floors of the Palmer House. What was lost in dramatic presentation was made up by the earnestness shown between production men seeking better methods for increasing wartime output and makers of materials and equipment with new ideas to offer industry. The display rooms were virtually free from casual sightseers.

As in past years, the Congress was sponsored jointly by the American Society for Metals, the American Welding Society, the Wire Association and the American Institute of Mining and Metallurgical Engineers. . . .

American Machinist Nov. 11, 1943

—V—

Tells of Changes In Inspection of Aluminum Parts

—Faragher

Reported by Ed Strauss
Aluminum Co. of America

Baltimore Chapter — Nearly 400 members and guests came to hear Paul V. Faragher of the Aluminum Co. of America talk on the inspection of aluminum products from the standpoint of written specifications at the first meeting of the current season.

Dr. Faragher discussed methods and changes in inspection standards, laying particular emphasis on the handling of aircraft parts made from wrought and cast aluminum products.

He stressed the necessity of judging minor defects on the basis of their effect on the performance of the material in service, not on appearance alone. This is important in periods of emergency if production requirements are to be met; also, production costs and consequently selling prices of materials are increased by unnecessarily severe inspection standards.

Specific examples were cited. While scratches and die lines are undesirable in parts subjected to repeated stress, the effect of a superficial scratch or die line may be insignificant in comparison with that of the rivet holes which must be drilled in assembly operations.

Similarly, scratches in Alclad sheet may penetrate to the alloy core and still have no measurable effect on the resistance of the material to corrosion, because of the electrolytic protection afforded by the adjacent coating metal.

Howes Bodfish of the Aluminum Co. of America led the discussion that followed.

Refreshments and entertainment wound up the meeting.

Oregon Chapter Has Annual Xmas Party

Reported by John E. Comfort
Pacific Metal Co.

Oregon Chapter—The regular December meeting was reserved for the annual Christmas party, which was held in the Stock Exchange Room of the Imperial Hotel on Dec. 10. The 183 members and guests present were invited to inspect the testing laboratory prior to the dinner; particular interest was evinced in the new 1943 model Rockwell C-65's.

Following the dinner Chairman Chisholm presented Past Chairman R. E. Neils with a certificate of chairmanship and a wool blanket in appreciation of the splendid work he did in carrying on the duties of his office.

A drawing was then held and eight lucky names were awarded a $2 door prize. The closing hour of the party was brightened by some choice entertainment.

Cape Cod Was Cradle of Iron Industry

History of Steel Making Traced By Bartholomew

Reported by L. Geerts
Republic Steel Corp.

Boston Chapter—A. J. Pepin, chief metallurgist of the Wyman Gordon Co. of Worcester, Mass., and Harvey, Ill., headlined as principal speaker at the Dec. 3rd meeting.

Introduced by Technical Chairman Ray Sault, Mr. Pepin spoke on "Aircraft Forgings", tracing the flow of forging sequence, heat treatment, inspection and the metallurgical control.

An added attraction was the showing of a motion picture in technicolor taken at the Quonset Naval Training Station covering the inspection, assembly and operation of a well-known aircraft engine.

Making it a double feature, Chairman Jim Baxter literally uncovered the coffee speaker, Past Chairman E. L. Bartholomew, chief engineer and metallurgist, United Shoe Machinery Corp. His subject "A Brief History of Steel Making on Cape Cod" pictured Eastern Massachusetts as the cradle of the iron and steel industry in the United States.

First Iron Works Founded in 1637

The first successful iron works in this country was founded in 1637 at Saugus, Mass., and the industry later spread to Braintree, Taunton, Raynham, Easton, Carver and Wareham.

An interesting installation was the Charlotte Furnace built at Carver in 1758. It was made of stone 24 ft. square by 20 ft. high. The walls were 7 ft. thick and lined with firestone (soft slate). A brick funnel was at the top. Two bellows 22 ft. long by 4 ft. wide served the air to the furnace.

Situated on a stream, it was driven by a water wheel 25 ft. in diameter. Bog ores dug from the bottoms of fresh-water ponds were used. These ores averaged 18 to 20% iron.

Built in 1758, this furnace was in production during the Revolutionary War and the War of 1812 and cast the cannon balls used by the frigate Constitution in its memorable battle with the Guerriere.

Mr. Bartholomew in 1908 was chemist at the Tremont Nail Co. at Wareham, at that time the largest steel plant in New England. This plant melted steel for ships' anchors, hollow-ware, stoves, tacks, and nails. When the battleship "North Dakota" needed a new rudder post, an 80,000-lb. corrugated ingot was cast at this plant and delivered to the Fore River Ship & Engine Co. to be forged. This was the first corrugated ingot poured in this country and represented the product of two open-hearth furnaces.

Cranberries Vs. Turnips

Versatile Mr. Bartholomew, in addition to his activities in the field of metals, is a successful farmer, being known to his associates as the "Cranberry King" of Cape Cod. Challenging his efficiency as a tiller of the soil, Past Chairman McDuff, "Turnip King of Cap Cod", boasted of his success with boron-indoctrinated soil and in evidence presented Mr. Bartholomew with a 16-lb. turnip he had grown.

Last reports have Mr. Bartholomew adding assistants to his metallurgical research staff who have Luther Burbank qualifications. Who knows? We may yet see a 16-lb. cranberry!

—V—

Welding Is First Manitoba Subject

Reported by E. M. Evans
MacDonald Bros. Aircraft, Ltd.

Manitoba Chapter—A very successful dinner meeting was held by one of the newest of A.S.M. chapters at the Marlborough Hotel in Winnipeg on the evening of Dec. 9.

Donald E. Mackinnon, superintendent of the Canadian National Railways Transcona Shops, agreed to take over the duties of chairman of the Publicity Committee vacated by Joseph F. Boux.

Seventy members and guests turned out to hear a discussion of a variety of problems in electric and gas welding. Guest speakers were Messrs. S. Pickup and A. Gregg of the Canadian Liquid Air Co.

Mr. Gregg showed some interesting experiments with liquid air, which, at 312° below zero, has our northern winters beaten slightly.

"Sid" Pickup, a well-known figure around this western country wherever anyone has a tough welding problem to solve, gave the paper of the evening on "General Purpose Welding". Electric and gas welding of gears, cylinder heads, crankshafts, rebuilding axles, brazing and cast iron welding, all came up for their share in the discussion.

Following the paper the Lindberg Engineering Co. film on "Heat Treating Hints" was shown.

Quiz Program Brings Forth Jersey Talent

Reported by R. L. Rickett
Research Laboratory, U. S. Steel Corp.

New Jersey Chapter this year offered entertainment of a more substantial but no less interesting sort in place of the usual Christmas party. The performers were eight former chairmen of the chapter who, although possibly not having quite the physical charm and agility of the performers usually presented at the December meeting, exhibited corresponding intellectual qualities in handling questions submitted by the members.

The occasion was a quiz program on theoretical and production metallurgical questions held on Dec. 20. Master of ceremonies was Cuyler Hasemann, chairman of the Chapter, who was assisted by N. E. Woldman, chairman of the Program Committee.

Questions on a wide range of subjects were sent in by members of the Chapter on cards mailed to them considerably in advance of the meeting. From these, enough were selected to keep the board of experts busily engaged for upwards of an hour. At the end of this time, questions were asked from the floor and a lively discussion resulted.

The array of talent represented by the board of experts proved capable and diversified enough to answer practically all of the questions asked. On this board were R. J. Allen, who took care of anything from cast iron to forging practice, C. S. Cronkright, an authority on heating problems, and E. S. Davenport, who was called upon to discuss heat treatment and the effects of alloying elements.

The non-ferrous field was represented by G. M. Rollason, who answered questions on aluminum, and H. D. McKinney, an authority on heat resistant alloys.

The steel suppliers were represented by J. W. Queen, Jr., who discussed hardenability and a number of other subjects, and by C. J. Wiegel, who, in addition to a profound knowledge of tool steels, proved to be an authority on the history of heat treatment and to have at least a smattering of chemistry as well. Questions on manufacturing practice were referred to J. B. Mudge.

In addition to this distinguished cast, several members of the audience contributed a great deal to the performance, which deserved to be one of the hits of the year, so far as the local chapter is concerned.

Three Stars Share Honors In Harrisburg

Reported by A. Floyd Whalen
Metallurgist, Harrisburg Steel Corp.

York Chapter—The Steelton Plant of Bethlehem Steel Corp. sponsored the annual Harrisburg meeting on November 10.

Some 175 members and guests attended a splendid dinner at the Penn-Harris Hotel, followed by a three-star attraction in the form of Major F. M. Brown and Capt. G. C. Bailey of the Army Air Intelligence School at Harrisburg speaking on "Bombing Enemy Industries", and Paul Ffield, materials engineer of the Bethlehem Shipbuilding Division, following with a talk on "Shipbuilding Materials and Fabrication".

Enemy Supplies Estimated

Major Brown produced figures and facts showing that America had accumulated knowledge of the metallurgical condition of our enemies which dated back many years. He told the amount of native ores, the quantities imported and the surplus stored. Then the estimated amounts being used each year were deducted and an estimate made of how long the supplies in sight would last—truly a fine example of constructive work.

Captain Bailey's lecture was illustrated with moving films of industries; views taken from the ground and then from thousands of feet in the air were compared and studied.

Ffield Discusses Ship Corrosion

Mr. Ffield developed an interesting approach to shipbuilding, attacking it from the angle of the corrosion hazard. Ships built for fresh water offer few problems compared to vessels that must spend their days in salt water.

A steel ship with a bronze propeller in salt water makes a perfect electrolytic cell. Addition of a substitute metal such as zinc that carries no load and does nothing but sacrifice itself to protect both the steel plates and the bronze propeller is a common practice.

Knowing how to design a ship to defend itself against corrosion thus becomes the bread and butter of the materials engineer of a shipbuilding corporation. The paint problem is also a large one, both in quantity and in properties, and extends into such things as toxic poisons to fight barnacles and other parasites.

Thanks and appreciation go to Jack Cotton who prepared the program, to Frank A. Robbins, Jr., general manager of the Bethlehem Steelton plant, who presided at the meeting, and to Rev. A. W. Hepler, who offered the invocation.

—V—

Eisenman, Van Horn Visit Louisville Chapter

Reported by H. N. Logsdon
Metallographer, Reynolds Metals Co.

Louisville Chapter's November dinner meeting brought forth as guests and speakers National Secretary W. H. Eisenman and Vice-President Kent R. Van Horn.

Mr. Eisenman in his after-dinner talk reviewed some of the functions and activities of the A.S.M. and expressed his approval of the progress made by the newly formed Louisville Chapter.

Dr. Van Horn, research metallurgist at Aluminum Co. of America, presented the technical address on "The Metallurgy of Aluminum Alloys". He covered, in general, the composition, physical properties and outstanding characteristics of sand cast, die cast, permanent mold, forging and wrought aluminum alloys.

—V—

Buy More War Bonds!

Heliarc Gives Flux-Free Welds in Mg

—Ward

Reported by L. E. Day
Metallurgist, Carrier Corp.

Syracuse Chapter—Three weaknesses of magnesium were pointed out by Robert E. Ward, assistant chief metallurgist, Eclipse-Pioneer Division of Bendix Aviation Corp., speaking on "Aluminum and Magnesium Alloys" at the meeting on Dec. 7.

Magnesium alloys will corrode rapidly in the presence of chlorides, have poor resistance to fatigue at high amplitudes and at frequencies above 500 cycles per second, and are of little use at temperatures above 400° F.

In welding magnesium alloys a flux inclusion is a point of extreme corrosion weakness. Therefore, the "Heliarc" process using an atmosphere of helium or argon without the flux gives better results.

Welding Skill Required

The electrode must be held very close to the work and the weld made very quickly. Considerable skill is required, since if the tungsten electrode should touch the work, it would give a tungsten inclusion which would also be a point of weakness.

Magnesium alloys can be given a chromate treatment to protect their surfaces during shipment and storage. However, this coating cannot compare in resistance to the anodized coatings on aluminum.

In heat treating magnesium alloys 0.5% of sulphur dioxide in the atmosphere will prevent the magnesium from oxidizing.

Although it is impossible to set fire to an ingot of magnesium by heating with a blow torch, finely divided magnesium is very inflammable. It is necessary to turn the work with very sharp tools and it is common practice to catch the grinding dust in light oil or water and to burn the sludge outside.

Die Casting Defects Shown

The aging heat treatment temperatures of both aluminum and magnesium alloys are so low that the temperature effects of stress relief annealing and of paint baking must be considered.

In the die casting of magnesium alloys, air inclusions preclude any subsequent heat treatment, since the air would expand and push out the heated metal. Another defect of magnesium castings is micro-porosity caused by the inability of the last portion of the melt to fill the interstices between the grains.

The "lost wax" method of casting, formerly little known outside the jewelry trade, is now being used for aluminum alloys with good results.

An interesting fact is that an ingot of magnesium alloy having a certain grain size can be remelted and recast and will have the same grain size. However, by superheating the molten metal 200 or 300° F. above its pouring temperature for some time, the grain size of the subsequent solid metal can be refined.

—V—

Brick Solves Metal Mysteries by Micros

(Continued from page 1)

was evidenced by a preponderance of retained austenite and coarse austenitic grain size.

Subsequent examination of properly quenched material indicated the necessity of dry-ice treatment to obtain complete austenite-martensite transformation and a dimensionally stable ring for this particular high temperature use.

Last but not least, a micro accidentally taken directly under electric stencil marks on the finished product revealed a completely austenitic, dendritic "as-cast" structure containing cracks.

A coffee talk by Sgt. Patrick J. Smith, U. S. Army Signal Corps, was enthusiastically received despite his unofficial but nevertheless strongly expressed opinion that the Japs will be very tough customers.

Van Horn's Subject at Dayton Is Radiography

Reported by Stewart M. DePoy
Metallurgist, Delco Products Div., G.M.C.

Dayton Chapter—National Officers' Night was held at the Engineers Club on Dec. 1 and was opened by Bill Eisenman's usual report on the situation in the National Office and on his farm (the latter now becoming an extensive annual report).

Kent R. Van Horn, national vice-president of the Society, gave a thorough lecture on radiography and X-ray diffraction.

Dr. Van Horn had expressed the opinion that his subject might not be interesting to the membership as a whole, but on the contrary, his vivid method of presentation held the attention of the entire audience and brought enlightenment on a subject little known in this district.

—V—

Payson Reduces Complexities of Annealing Cycles

Reported by Walter G. Patton
Climax Molybdenum Co.

Detroit Chapter—Peter Payson, chief research metallurgist of the Crucible Steel Co. of America, has not yet reduced the job of annealing steel to a point where a plant metallurgist can spin a wheel or manipulate a slide rule and come up with an annealing cycle that is guaranteed to work, regardless of problems involving segregation, batch handling or work transfer. It is not too much to say, however, that Mr. Payson has come about as close as anyone to reducing the complex job of preparing steels for machining to a few, well-ordered principles.

Based on S-Curves

What Mr. Payson has done, in most convincing fashion, is to condense the technicalities of annealing to a point where he can say, "Here it is. Come and get it." And the 350 members who listened to Mr. Payson's lecture on Nov. 8 and took home a 59-page, illustrated booklet containing Mr. Payson's principles for annealing steel undoubtedly felt they had something worth while.

Mr. Payson's booklet contains a galaxy of S-curves—including plain carbon, low alloy constructional steels, die steels, high speed and stainless types. Microstructures are reproduced, enabling the heat treater to follow the effect of annealing cycles on the amount, character and distribution of transformation products.

Gives Uniform Structure at Lower Cost

The principles Mr. Payson advocates are flexible and widely adaptable—something which is very much in their favor. Whether the heat treater employs isothermal annealing, slow cooling or quenching and tempering (spheroidizing), Mr. Payson—on the basis of his studies of S-curves—can tell him how to cut his furnace time to a minimum and yet obtain predictable and uniform results.

All of which may be translated into more uniform structures for lower cost machining, reduced furnace time and greater production of the sinews of war.

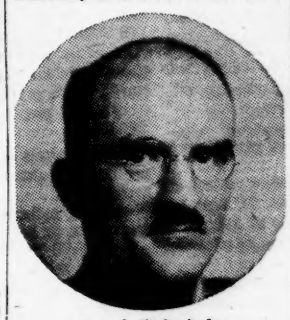
Paul Eddy served as technical chairman and conducted an interesting question and answer period.

The coffee talk, presented by Waldo E. Waterman, chief engineer of Stout Research Laboratories, described some of the foolproof aircraft developed prior to the war in conjunction with the safety program of the Civil Aeronautics Authority.

Prof. Oesterle of Wisconsin Dies Suddenly

PROFESSOR JOSEPH F. OESTERLE, a member of the Department of Mining and Metallurgy at the University of Wisconsin, died Dec. 17 at the age of 55 years. He had been ill only a short time and his death is keenly felt by his many friends and close associates.

Professor Oesterle was born in Philadelphia in 1888 and in 1913 received the degree of B.S. from the University of Wisconsin. He served



Joseph F. Oesterle

as a metallurgist with the Pennsylvania railroad until 1916 and then went to Gary, Ind., as a metallurgist for the Illinois Steel Co.

In 1918 he enlisted in the armed service of his country and after his discharge he served as associate physicist in the Bureau of Standards, Metallurgical Division.

In 1921 he returned to the University of Wisconsin, where he carried out extensive investigative work on the viscosity and sulphur solubility of blast furnace slags. He received the degree of Ph.D. in metallurgy in 1929.

He rose from the rank of assistant professor through associate professor to full professor and in 1940 was appointed chairman of the Department of Mining and Metallurgy at the University.

Professor Oesterle was a tireless worker and was active in the A.S.M., American Institute of Mining and Metallurgical Engineers, American Foundrymen's Association, and Society for the Promotion of Engineering Education. He often served on important committees connected with these societies.

In addition to his many other activities, Professor Oesterle found time to act as consulting metallurgist for a number of neighboring companies, as witness the feature story reprinted from a Milwaukee paper in the December REVIEW.

JOHN S. RICHARDS

JOHN S. RICHARDS, director of research of the American Steel & Wire Co., died suddenly at his home in Cleveland on Dec. 23. Mr. Richards was representative on the sustaining membership of the American Steel and Wire Co. in the Cleveland Chapter, A.S.M.

Born in McKeesport, Pa., in 1894, Mr. Richards was graduated from the Carnegie Institute of Technology in Pittsburgh, having majored in chemistry, engineering and metallography. He started working for the National Tube Co. as a chemist in McKeesport in 1912.

The following year, he was transferred to the Edgar Thomson Works of the Carnegie Steel Co. as assistant chief chemist, which post he held until he was made head chemist at the Donora (Pa.) Steel Works of the American Steel & Wire Co. in 1928.

In 1934 Mr. Richards moved to Cleveland as a metallurgist in the main offices. He was manager of the metallurgical division from April, 1937, to March, 1942, when he was appointed director of research of the company.

—V—

Since Hitler entered Austria, American steel companies have invested nearly $1,205,000,000 to increase capacity and improve their equipment.

Four Methods Used To Detect Decarburization

—Lewis

Reported by Capt. R. D. Springer
St. Louis Ordnance District

St. Louis Chapter—Presence of a soft skin on a heat treated tool cannot always be blamed on decarburization, it was pointed out by Harry E. Lewis, industrial heating application engineer, General Electric Co., at the meeting on Nov. 19. Mr. Lewis discussed detection and prevention of decarburization.

This soft skin might result from overheating in the case of high speed steel, or it might be retained austenite. Soft skin may also be caused by contamination of the piece from contact with the hearth plate in the furnace.

Decarburization may be detected by any one of four methods—hardness testing, photomicrographs, chemical analysis, and change in weight, depending upon the particular problem presented. Generally speaking, Mr. Lewis said, the change in weight method is most accurate to determine the amount of decarburization present.

Preventing Decarburization

Prevention of decarburization is a function of the equilibrium of the furnace atmosphere, of the condition of the furnace, the time in the furnace, and the analysis of the steel. The protective atmosphere should have very low percentages of CO_2 and water vapor, preferably zero of each, and a small amount of some compensating gas, such as CO or methane, to provide for the contamination obtained when the furnace door is opened for charging or discharging.

A small quantity of methane is very important in reducing the quantities of water vapor and CO_2 present in most furnace gases; however, satisfactory compensation cannot be made for appreciable quantities of these gases.

Furnaces Purged After Shutdown

Upon starting a new furnace, or reheating after being down for several days, Mr. Lewis pointed out the importance of thoroughly purging the furnace to rid the firebrick of water vapor and other harmful gases trapped during the shutdown.

The furnace should be purged up to 24 hr.—until the atmosphere in the furnace tests a low dew point and a low percentage of CO_2. After an overnight shutdown, the purging time is much shorter. In order to obtain consistent results, it is best to operate atmosphere furnaces continuously.

A lively discussion period followed completion of the talk, in which several individual problems were presented to Mr. Lewis for his comment and clarification.

—V—

Aluminum foil is used for packing the coffee in the American doughboy's Ration "K". The foil is a mere 0.001 in. thick, and the packets weight barely 6 grams when filled.

Induction Heating Finishes Parts to Close Tolerances

—Curtis

Reported by G. B. Berlien
Metallurgical Engineer
Lindberg Steel Treating Co.

Chicago Chapter—A highly practical and instructive talk was given by Frank W. Curtis of the Induction Heating Corp. on "Induction Heating for Hardening and Brazing", on Nov. 13.

Induction heating is making it possible to finish machine tools and parts to much closer tolerances than have ever previously been employed, Mr. Curtis pointed out. Many parts that heretofore had been considered impossible to maintain to dimension during heat treatment are now quite commonly machined, ground, then hardened and assembled ready for service.

Tempering and annealing can also be handled efficiently by the induction heating method. Heated area is so localized that there will be no run-out of heat to portions that must remain hard.

Mr. Curtis's talk has been reported in detail when presented before other chapters of the Society. A rapid-fire question period followed the regular meeting and even after formal closing of the meeting, one needed a priority to get near enough to Mr. Curtis to have his questions answered.

A wide selection of parts that had been heat treated by induction were exhibited by Mr. Curtis and further clarified the subject matter of his talk. He also presented a moving picture illustrating the methods and principles used in induction work.

—V—

Duties of Engineer Involve Labor Relations

(Continued from page 1)

vide the opportunity for the people to contribute their share to the economy of the country. The gap between management and labor must be closed. Engineers must get down to earth, and if professional men in general wish to feel superior, they must not show it.

Engineers must be salesmen, able to maintain good employee relationship when replacing men by new methods. The most important tools are words, which must be used constructively.

Management philosophy must be to sell products at the lowest possible price with highest wages possible, and last but not least, with a fair return to the stockholder, who risked his money in the first place. Top management, labor and the Government must cooperate.

Management must realize its part in social economics and the government must take the handcuffs off business, and encourage capital to make investments, which in turn will make jobs.

?? Steel Quiz ??

A 70 per cent score on this quiz is a good average. Answers are on page 7.

1. Steel production in 1943 is expected to reach nearly *(a) 70,000,000; (b) 80,000,000; (c) 90,000,000 tons.*

2. One out of *(a) three; (b) seven; (c) ten* of the number of workers employed by the steel industry in August 1940 is now in the armed forces.

3. Under pressure of war production and the training of thousands of new workers the 1942 accident rate in the steel industry *(a) rose; (b) declined; (c) held constant.*

4. The American steel industry is producing every week more than the tonnage of steel needed to build *(a) 53; (b) 17; (c) 2* big battleships.

5. Nearly *(a) one-fifth; (b) one-fourth; (c) one-fifteenth* of rail freight in 1942 was carried to or from steel plants.

6. Though the number of women steelworkers has multiplied in wartime, they are still used only on inspection jobs. *True* or *False.*

7. It takes about *(a) 5 months; (b) 5 days; (c) 5 hours* to produce a finished piece of battleship armor.

8. Last year New York State produced ten times more iron ore than it did in 1935. *True* or *False.*

9. For every thousand tons of steel plates produced, almost *(a) 100; (b) 540; (c) 4400* tons of raw materials are consumed.

10. From the fall of France in June 1940 through the first nine months of 1943, the American steel industry has produced over 278,000,000 tons. *True* or *False.*

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Prepared by Engineering Societies Library, New York City

1942

Alternate alloy steels and conservation of strategic alloys. (American Society for Testing Materials, Bulletin, no. 117, p. 29-43, Aug. 1942).

Includes NE steel compositions and applications—8000 series.

American Society for Testing Materials—Report of Committee A-1 on steel. (American Society for Testing Materials, Proc., v. 42, p. 73-103, 1942).

General statement on the National Emergency steel specifications project.

Davis, E. F.—National Emergency gear steels. (Iron Age, v. 150, p. 45-9, Aug. 6, 1942; p. 58-64, Aug. 13, 1942).

Discusses applications of the NE 8000 series for gear manufacture; second article is devoted to the use of the Amola or 4000 series for gears.

Diederichs, W. J.—Another automotive user reports on experience with NE alloy steels. (Steel, v. 111, p. 62, Nov. 30, 1942).

Autocar Co.'s applications of NE 8744, 8749 and 8620.

End-quench hardenability curves of NE steels. (Metal Progress, v. 42, p. 857, Nov. 1942).

For 23 representative NE steels and 27 comparable S. A. E. steels.

Foley, F. B.—Appraisal of NE steels in terms of old types. (Metal Progress, v. 42, p. 365-7, Sept. 1942).

Uses Jominy hardenability curves to predict heat treatment, properties and utility.

Frischman, T. A.—A metallurgical study of some NE alloy steels. (Steel, v. 111, p. 99, 119-23, Dec. 14, 1942).

NE 8620, 8720 and 8817—machinability, carburizing characteristics, hardenability.

Jameson, A. S.—NE alloy steels. (Steel, v. 111, p. 112-4, 116, 118, Dec. 7, 1942).

International Harvester gives results of test of NE 8720 for roller bearings.

Jameson, A. S.—Physical properties of NE carburizing steels. (Iron Age, v. 150, p. 58-64, Sept. 17, 1942).

A correlation and comparison of the standard NE carburizing steels and their alternates based on tensile, hardenability and carburizing tests.

Jameson, A. S.—User report no. 6 on experience with NE alloy steels. (Steel, v. 111, p. 79-2, 107-8, Dec. 21, 1942).

Details of tests and applications of NE 8339, 8442 and 8739 used for capscrews.

Jones, J. H.—National Emergency steels NE 8600 and 8900. (Metal Progress, v. 41, p. 793-9, June 1942).

Results of laboratory tests give properties of carburized cores; transverse and end-quench hardenability; influence of mass; critical points; coarsening temperatures; sub-zero toughness.

Metalurgency. (Tool and Die Journal, v. 8, p. 48-52, 127, Nov. 1942).

Discusses cause of emergency in high alloy steel supply; fluctuating supply and demand; gives examples of savings effected by use of NE steels.

Morris, M. J. R.—Application of NE steels. (Industrial Heating, v. 9, p. 1608, 1610, 1612, Dec. 1942).

Discusses application of NE chromium-nickel-molybdenum series.

National Emergency alternates for alloy steels. (Metal Progress, v. 41, p. 342-4, 347-9, March 1942).

Supply of alloying elements; NE steels to substitute for old carburizing; semi-thorough and thorough hardening grades; representative uses of specific alloys.

National Emergency steel specifications. (Product Engineering, v. 13, p. 182-3, April 1942).

Includes tables exhibiting analyses of NE steels and standard steels and their NE equivalents—only the 8000 series given.

National Emergency steels—NE 8000 series. (American Iron and Steel Institute, Contributions to the Metallurgy of Steel, no. 7, Aug. 1942. 50p.).

Development of new series of steels. Gives compositions, physical property data and applications of this series. Appendix has brief description of the Jominy test with list of references on hardenability testing.

NE alloy steels. (Steel, v. 111, p. 96-7, 100, 102, 104, 107, 108, Nov. 9, 1942).

Charts give end-quench hardenability tests on NE 9400, 9500 and 9600 series and suggested alternates for some of the 8000 series.

New series added to conserve critical alloying elements. (Steel, v. 111, p. 41-2, 76, 81, Aug. 31, 1942).

Composition of new NE 9400, 9500 and 9600 series; end-quench hardenability tests of NE 8024, 8124, 8245, 8339, 8547 and 8720.

New steels conserve vital alloying elements. (Machine Design, v. 14, p. 65-6, July 1942).

Includes 5 tables listing NE steels replacing more highly alloyed steels—deals only with the 8000 series.

Parker, C. M.—National Emergency steels. (Metals and Alloys, v. 16, p. 622-9, Oct. 1942).

Design of the steels, molybdenum and manganese, hardenability, effects of elements on properties, microstructure and heat treatment and uses of the 8000 series.

Parker, C. M.—NE alloy steel data. (Steel, v. 111, p. 66-8, 70, 72, 74, 76, 95-7, Oct. 19, 1942).

Table of successful NE steel applications given as well as information on standard end-quench hardenability tests—8000 series.

Parker, C. M.—NE alloy steels. (Steel, v. 111, p. 70-1, 101-2, 110-1, Aug. 3, 1942).

Discusses development, purpose, selection and predetermination of performance—8000 series.

Properties of new NE alloy steels. (Steel, v. 110, p. 66-9, June 8; p. 66-8, 70, 72, June 15, 1942; v. 111, p. 80-2, 84, 86, July 13, 1942).

Charts give physical test results of many of the NE 8000 series.

Riegel, G. C.—Heavy equipment manufacturer reports on successful applications of NE alloy steels. (Steel, v. 111, p. 90, 96, Nov. 23, 1942).

Caterpillar Tractor Co. gives their experience with NE 8024, 8447, 8620, 8630, 8724, 8739, 8744, 8749, 8817 and 9460.

Saving alloys in steel by using "addition agents". (Metal Progress, v. 42, p. 1061-9, 1100, Dec. 1942).

Improved hardenability of NE 8442, 9260, 9420 and 9440 after special treatment.

Spalding, S. C.—Steel substitutes for tools, jigs and fixtures. (Tool Engineer, v. 11, p. 65-9, Aug. 1942).

Effect of priorities and war demands on availability of tool and die steels—a table gives existing steel specifications with NE equivalents for tool room work.

Supplementary National Emergency steels, NE 9400, 9500 and 9600 series. (American Iron and Steel Institute, Contributions to the Metallurgy of Steel, no. 8, Sept. 1942. 89p.).

Gives compositions, physical properties and Jominy test data.

War emergency specifications are proposed for refinery bolting to conserve alloys. (National Petroleum News, v. 34, p. R-257-9, Aug. 26, 1942).

Suggests some of the NE steels as substitutes for low chromium and nickel steels in many refinery bolting applications.

Wellauer, E. J.—Substitution of material in war effort. (Machinery (N.Y.), v. 49, p. 226-9, Nov. 1942; see also Machine Design, v. 14, p. 66-9, 146, 152, 154, 156, Nov. 1942; Steel, v. 111, p. 106-7, 129-35, Nov. 16, 1942).

General information on physical properties, hardness, wear, machinability, heat-treatment and suitability of NE steels.

Willis, A. C. and Hill, M.—Suitability of alternate steels for aircraft parts. (Metal Progress, v. 42, p. 370-5, Sept. 1942).

Compares NE 8630, 8735, 8739 with S.A.E. 4000 series; tensile properties of bars, notched bar tests, hardenability, heat treatment, tests on aircraft bolts.

The working of National Emergency steel. (American Machinist, v. 86, p. 1095-1106, Oct. 1, 1942).

Discusses: The selection of a steel; Forging and heat treatment; Recommended applications of NE steels; Properties of NE steels; Machining NE steels. All series.

WPB issues emergency steel list. (Steel, v. 110, p. 72, March 16, 1942).

Specifications of some NE 8000 series; alternate alloys for steels heretofore in use.

1943

Bissett, G.—User report no. 22 on experience with NE alloy steels; replacement, not substitution. (Steel, v. 113, p. 132, 135, 170, Nov. 15, 1943).

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Bonham, L. D.—Weldability of NE 8630 steel. (Western Metals, v. 1, p. 10-3, Jan. 1943).

Report of tests conducted by the Production Research and Structures Research groups of the Lockheed Aircraft Corp. Compares the SAE 4130 and NE 8630 as to their suitability for spot welding, arc welding and oxy-acetylene welding.

Born, F.—User report no. 21 on experience with NE alloy steels. (Steel, v. 113, p. 110, Nov. 8, 1943).

Report on experience of Warner Electric Brake Mfg. Co., Beloit, Wis., using NE 9445 for brake shaft forging; NE 9440 for cam shaft for parking brake; other cams use NE 8744 and 9445.

Boston, O. W.—Machinability of National Emergency alloy steels. (Metal Progress, v. 43, p. 543-7, April 1943).

Case histories of machinability of: NE 1330, 1335, 1340, 1345, 1350, 52100 A, B and C, 8024, 8620, 8720, 8949, 9200 and 9400.

Butzner, J. I.—The Iron Age NE steel—standard steel chart. (Iron Age, v. 151, folded table, May 6, 1943).

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Comparison data showing relationship between standard steels and NE alloy steels. (Steel, v. 112, p. 102-5, Feb. 22, 1943).

Physical properties compared by series of charts.

Emergency steels for wartime mining. (Mining Congress Journal, v. 29, p. 34-5, 38, 40, March 1943).

Mining industry can obtain NE steels if need can be proved to WPB office. Chart of NE steel compositions is given.

Emerson, R. W.—Weldability of NE-8339 manganese molybdenum steel piping. (Welding Journal, v. 22, supp. 170-8, April 1943; see also Steel, v. 113, p. 88-9, 92, 95-6, July 26, 1943).

Gives hardness tests, tensile tests and jig bend tests of welded manganese-molybdenum steel.

Fess, E. E.—Correlating NE and SAE steels. (Western Metals, v. 1, p. 8-12, April 1943).

Discusses: Mechanical properties, Hardenability, Fatigue strength, Weldability and Forging qualities of the NE 8000 and 9000 series.

Field, J.—Calculation of Jominy end-quench curve from analysis. (Metal Progress, v. 43, p. 402-5, March 1943).

Table gives analysis and grain size of NE-9430, 9440, 9450, A 1340, 9630, 9640, 8630 and 8720.

Harder, O. E. and Voldrich, C. B.—Weldability of NE 1330 and NE 1335. (Metal Progress, v. 43, p. 409-10, March 1943).

Brief comparison of the weldability of SAE 1030 and 1035 with NE 1330 and 1335.

Hill, M.—Test on NE 8630 steels for welded air frames. (Metal Progress, v. 43, p. 555-9, April 1943; see also Welding Journal, v. 22, p. 300s-4s, July 1943).

Gives weldability and tensile properties of NE 8630 steels.

Horak, F. and Champlin, E.—User report no. 14 on experience with NE alloy steels. (Steel, v. 112, p. 106-8, June 7; p. 98-9, 126, June 14; p. 92-4, June 21, 1943).

Physical properties, hardenability and applications of NE 8620, 9422 and 9430.

How to use the NE alloy steels. (Steel, v. 112, p. 78, 81-2, 84, 91, March 22, 1943).

General discussion on end-quench hardenability testing and selection of NE steels.

Intensifying of NE 9440 steel. (Iron Age, v. 152, p. 56-7, July 1; p. 50-1, Aug. 19, 1943; see also Steel, v. 113, p. 100, 102, Sept. 27, 1943).

Effect of the addition of Grainal on the Jominy hardenability, tensile properties and impact strength of NE 9440 steel.

Intensifying of NE 9422 steel. (Iron Age, v. 152, p. 50-1, Aug. 19, 1943).

Effect of the addition of Grainal on the Jominy hardenability, tensile properties and impact strength of NE 9422 steel.

Jameson, A. S.—Effect of boron containing additions on NE steel. (Iron Age, v. 151, p. 45-50, March 25, 1943).

Using addition agent containing 0.5% boron in NE 9420 and NE 9440 alloy steels. Most important effect is to increase hardenability.

Jameson, A. S.—User report no. 9 on experience with NE alloy steels, type NE-9420. (Steel, v. 112, p. 100-1, 103-4, 106, 134, Feb. 1; p. 125, Feb. 8, 1943).

Tensile and hardenability test results—carburized and uncarburized.

Jameson, A. S.—User report no. 11 on experience with NE alloy steels. (Steel, v. 112, p. 96-8, 100, 102, 136, 145, March 15, 1943).

Hardenability values and physical properties of NE 9440 and 9640 steels.

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Kahn, W., Jr.—User report no. 17 presents experience of an aircraft manufacturer with NE alloy steels. (Steel, v. 113, p. 107, Aug. 23, 1943).

Compares results of physical tests of NE 8739 to SAE 4140. Test of NE 8620 as a carburizing steel.

Lytle, A. R. and Koopman, K. H.—Weldability of NE 8630 steel for aircraft structures and a suggested specification for weld metals. (Welding Journal, v. 22, supp. 82-93, Feb. 1943).

Compares the welding characteristics of NE 8630 and SAE X4130; suggests a method of specifying the properties to be required of the weld metals.

Mechanical properties—NE 9400, 9500 and 9600 series. (American Iron and Steel Institute, Contributions to the Metallurgy of Steel, no. 10, March 1943. 76 p.).

Gives such tests as tensile, Charpy impact, Izod impact and standard end-quench hardenability.

Metallurgical aspects of the National Emergency steels. (Metal Progress, v. 43, p. 77-90, Jan. 1943).

Collection of papers presented at one of the American Society for Metals meetings on war products.

Jominy, W. E., End-quench test and its application; Rickett, R. L., Planning heat treatment by S-curves; Riegel, G. C., Shop performance of NE steels; Jones, J. H., Properties of NE steels at room and subnormal temperatures; Frischman, T. A., Carburizing grades of NE steels; Webb, L. E., Heat treating for machinability.

Metallurgical features of NE steels. (Heat Treating and Forging, v. 29, p. 36-9, Jan. 1943).

Information on selection of NE steels; results of tests on metallurgical features are reported, as Jominy end-quench hardenability test; heat treatment, interpretation of Jominy results.

National Emergency steel specifications, revised Aug. 15, 1943. (Welding Engineer, v. 28, p. 79, Oct. 1943; Metal Progress, v. 44, p. 672, Oct. 1943).

Gives all NE series.

National Emergency steels. Cleveland, American Society for Metals, 72 p. 2nd complete revision, Aug. 1943.

Digests available information on engineering properties of all current NE steels.

National Emergency steels. (Machine Tool Blue Book, v. 39, p. 113-4, 116, 118, 120, 122, 124, 126, 128, Feb. 1943).

General information with illustrations and tables; touching especially on hardenability tests.

National Emergency steels; NE 1300 series. (Metal Progress, v. 43, p. 711-5, May 1943).

Treats of the manufacture, forgeability, annealing, hardenability of NE 1300 series.

Nilson, C. and Herbenar, A. W.—Hardenability in evaluating physical properties of NE alloy steels. (Steel, v. 112, p. 118-9, 150-5, April 5, 1943).

Standard hardenability data may be used for the comparative selection of steels. Shows their replacement and substitution chart.

Patton, W. G.—Mechanical properties of NE, SAE and other hardened steels. (Metal Progress, v. 43, p. 726-33, May 1943).

General discussion on the mechanical properties of NE and SAE steels.

Pierce, W. J.—User report no. 20 on experience with NE alloy steels. (Steel, v. 113, p. 120-1, 134-6, Sept. 20, 1943).

Outlines the experience and procedure followed at Glenn L. Martin Co. when replacing basic steels with NE.

Roush, R. W.—Evaluating NE steels. (Machine Design, v. 15, p. 108-10, Feb. 1943).

Hardenability curves for NE 9420 and 9430 are given; weldability of NE 8630; touches on suitability of 9400 series for rear axle and transmission gears.

Roush, R. W.—Production experience with National Emergency steels. (Society of Automotive Engineers, Journal, v. 51, p. 84-93, March 1943; abstracted in Machine Design, v. 15, p. 108-10, Feb. 1943; see also Steel, v. 112, p. 94, 96, 98, 135-7, March 1; p. 109-10, 137-9, March 8, 1943; Iron Age, v. 151, p. 57-61, March 4, 1943).

General report on the development of the NE steels, especially hardenability.

Ryerson, J. T. and Son, Inc.—NE (National Emergency alloy steels), facts and figures for practical use. Chicago, J. T. Ryerson, rev. 1943. 30 p.

General information on NE steels, includes hardenability tables, physical properties and NE steels in Ryerson stock.

Shepherd, B. F.—Martempering. (Iron Age, v. 151, p. 45-8, Feb. 4, 1943).

This technique of quenching is applicable to NE steels; data on cooling rates, transverse hardness for various NE steels in the 8000 series, description of the salt bath furnace used for quenching.

(Continued on opposite page)

Social Affairs Replaced by Educational

Reported by F. N. Meyer
American Brass Co.

New Haven Chapter — Gasoline rationing and the pleasure driving ban last year forced the Chapter to abandon its annual spring outing. These same factors, plus the long hours put in on war work by members, caused the Chapter officers to consider whether or not to follow the lead of some other chapters in dropping educational activities.

They and the Executive Committee finally decided that, instead, the educational activities should be continued and improved, if possible, by using extra funds normally spent in social festivities. The courses to be given were deemed justifiable if they were specifically devoted to improving the quality or quantity of war production.

Three short courses were planned: I. Tool Steels; II. Special Tool Materials; and III. Non-Ferrous Foundry Problems.

The first two have been completed and were eminently successful from all viewpoints, as shown by an attendance of from 80 to 100. They were a service to members and a service to war industries, as evidenced by the number of men who became members to take the course or paid a special non-member fee.

M. J. Weldon of the H. G. Thompson & Son Co. conducted the first section. He covered water hardening, oil hardening and air hardening steels in a manner understandable to the practical heat treater, but at the same time showed the usefulness of an understanding of theory when it came to handling special problems.

The second section, on special tool materials, was less metallurgical in character but certainly of equal interest to the Chapter members. George Fraser of the Crucible Steel Co. covered the subject of hard cast alloy tools and brought out many interesting facts on the uses of these unusual alloys.

The other two meetings of this section were devoted to carbide tools, their manufacture, characteristics and uses. T. D. MacLafferty of the Carboloy Co. handled this subject in a practical manner, particularly emphasizing the special properties of carbides.

The last section of the planned program was held in abeyance to see how the membership liked the first two parts. Their success certainly justified the effort and costs; now it remains to find a competent expert on non-ferrous foundry problems to plan the course.

New Haven Executive and Advisory Committees

The Advisory Committee of the New Haven Chapter, Shown Seated in the Front Row, Is Made up of Past Chapter Chairmen. They are, left to right, J. F. Sargent, A. V. Pollard, D. F. Sawtelle, A. D. Eplett, H. Fish, and F. J. Dawless. The Executive Committee, shown standing in the rear, consists of F. C. Holmgren, Chairman G. L. Richter, M. J. Weldon, H. R. O'Malley, S. E. Sinclair, E. C. Richardson, F. N. Meyer, P. H. Tomlinson, E. M. Manning, Vice-Chairman F. E. Stockwell, B. Baker, R. M. Brick, H. H. Etter, and Secretary-Treasurer L. A. Ward.

Plastic Uses Based on Wide Property Range

Reported by G. L. White
Editor, Canadian Metals and Metallurgical Industries

Ontario Chapter departed a bit from the usual metallurgical subject to learn something about one of the growing competitors of metals at its meeting in Toronto on Dec. 3. A. E. Byrne, Canadian General Electric Co., Ltd., gave an interesting address on plastics, discussing the general types, their application, and future possibilities.

Mr. Byrne pointed out that much of the interest in plastics, as well as much of their applicability, arises from the fact that for the first time in these materials man can secure the physical properties that he wants (within certain limits).

Plastics are produced in a great variety of compositions and properties. In looking at the field of plastics, one must remember that it must now be considered comparable in scope to the field embraced by the word "metals".

The speaker outlined the physical classifications of synthetic resins into thermoplastic and thermosetting materials and also some of the many chemical classifications.

In discussing manufacturing technique, Mr. Byrne gave due credit to metals for constituting the alloy steel molds which are the heart of the plastics molding industry. Various molding procedures were described, including transfer molding and injection molding.

The speaker had a very interesting display of plastic parts indicating particularly the extent to which plastics have been employed in the production of war equipment.

Looking to the future, Mr. Byrne was not willing to prophesy that we are entering a plastics age but he does believe that there will be more extensive use of plastics to do those jobs which can thus be done better at a lower price.

New Rolling Methods Permit Longer, Wider, More Uniform Sheets

—Hayes

Reported by G. B. Berlien
Metallurgical Engineer
Lindberg Steel Treating Co.

Chicago Chapter—"Producing Flat Rolled Steels for Forming and Drawing" was the subject of an interesting and informative paper by Anson Hayes of the American Rolling Mill Co., presented on Dec. 9.

Dr. Hayes described present day rolling procedures as compared with those of fifteen years back, explaining why it is now possible to produce longer and wider sheets of far more uniform structural characteristics than could be performed with original rolling practices.

Mill control on sheet stock enables us to perform more difficult drawing operations with safety, thereby widening the field of application of this type of material.

The technical chairman, E. F. Lundeen of Inland Steel Co., then acted as a discussion leader for the question period. It seemed that practically everyone present had some question relative to the subject, and Dr. Hayes and Mr. Lundeen answered questions covering the entire field for nearly an hour and a half.

The Chicago Chapter is indebted to Dr. Hayes for an unusually interesting meeting.

—V—

Timken Adv. Mgr. Named

The Timken Roller Bearing Co. announces the appointment of Paul Reeves as advertising manager to succeed Roland P. Kelley who has occupied that position for the past 17 years, and has resigned to go into advertising agency work.

Mr. Reeves is a graduate of Carnegie Institute of Technology with a degree in mechanical engineering, and has been with Timken since 1929. Since 1940 he has been in charge of Government priorities.

Bibliography of the National Emergency Steels—(*Continued from opposite page*)

Society of Automotive Engineers—Handbook, 1943 edition. N. Y., Society of Automotive Engineers, 1943. 810 p.

"National Emergency steel compositions", insert facing p. 302. Covers all NE series.

Sorenson, J.—User report no. 12 on experience with NE alloy steels. (Steel, v. 112, p. 72-3, March 29, 1943).

Discusses suitability of NE-8739 and 8744 steels used in moderately stressed heavy duty truck parts—gives physical properties comparison.

Specifications issued for NE carbon steels. (Steel, v. 112, p. 90-2, 94, 96, 98, March 8, 1943).

Locomotive forging data on NE 8744, physical test data on NE 9540, 9430, 9420 and 9440.

Staiger, J. H. and Wheeler, F. G.—How to predict success of alternative steels. (Machine Design, v. 15, p. 113-5, May 1943).

Physical properties and hardness of an untried analysis of steel can be determined from Jominy test results.

W. P. B. Iron and Steel Committee accelerates comparative tests on NE 9400 series steels. (Society of Automotive Engineers, Journal, v. 51, p. 20-1, 37-8, Aug. 1943).

Impact tests of torque rod end pins of NE 9445 and 8744; tests on NE 9420 for universal joint forgings and spiral-bevel gears; NE 9437 for wheel studs; tests of NE 8600 and 9400 series steels.

Welchner, J. and Roush, R. W.—Supposed graphite in carburized NE and SAE steels. (Metal Progress, v. 43, p. 889-96, June 1943).

Discusses the absorption of oxygen during the carburizing process, producing a physical condition on the surface of carburized parts, influencing its behavior when subjected to stresses.

Wellauer, E. J.—User report no. 19 on experience with NE alloy steels. (Steel, v. 113, p. 106-8, 110, 112, Sept. 6, 1943).

Ten years of experience with low alloy steels used for industrial gears, particularly the commercial and speed reducer types.

Wescott, B. B.—User report no. 8 on experience with NE alloy steels in the oilwell drilling and equipment industries. (Steel, v. 112, p. 68-9, Jan. 18, 1943).

Medium carbon NE 8400, 8700 and 8900 series prove adequate substitutes for tool joints, reamer bodies, subs and rock bit parts.

Widrig, S. L.—User report no. 7 on experience with NE alloy steels. (Steel, v. 112, p. 60-2, Jan. 11, 1943).

NE 8600 and 8700 series used for heavy duty transmission gears.

Wilson, J. E.—NE steel fundamentals. (Western Metals, v. 1, p. 11-7, Feb. 1943).

Short history of NE steels precedes main text dealing with general hardenability tests.

Young, M. and Hanink, H. H.—User report no. 13 on experience with NE alloy steels in aircraft engines. (Steel, v. 112, p. 84-5, 126, 128-31, April 26, 1943).

Table of tentative alternate steel composition—aircraft quality; hardenability values and carburizing.

Zima, A. G.—National Emergency steels. (Canadian Institute of Mining and Metallurgy, Trans., v. 46, p. 140-53, May 1943).

Discusses standard hardenability tests, selection of steel, weldability, machinability of all NE steels in general. Forgeability tests on NE 8744, 9315, 8620; mechanical properties of NE 8339, 8620 and 8744.

Zwald, A.—User report no. 16 on experience with NE alloy steels. (Steel, v. 113, p. 94-5, 130-1, Aug. 2, 1943; see also Foundry, v. 71, p. 175-7, Sept. 1943).

Heat treated cast steel transmission gears of NE 9437.

CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	Feb. 4	Hotel Sheraton		
British Columbia	Feb. ..		D. B. Reeder	
Buffalo	Feb. 10		E. L. Wood	
Calumet	Feb. 15	Phil Schmidt's Restaurant, Roby, Ind.	J. O. Almen	Fatigue of Metals as Influenced by Design and Internal Stresses
Canton-Mass.	Feb. 9	Elks Club	M. A. Grossmann	Hardenability of Steel and Effect of Alloys
Chicago	Feb. 10	Chicago Bar Association Clubrooms	Ray McBrian	Metallurgical Inspection
Cleveland	Feb. 7	Cleveland Club	M. A. Grossmann	Hardenability of Steel
Columbus	Feb. 8	Fort Hayes Hotel	Norman Stotz	Tool and Die Steels
Detroit	Feb. 14	Horace H. Rackham Bldg.	M. A. Grossmann	Hardenability of Steel
Indianapolis	Feb. 21	Y.W.C.A.	G. B. Berlien	Heat Treating Hints
Golden Gate	Feb. 16		Dr. Brother	Plastics
Lehigh Valley	Feb. 4	Hotel Bethlehem, Bethlehem, Pa.	M. A. Grossmann	Hardenability of Steel
Louisville	Feb. 15	Kentucky Hotel	Lt. Col. Geo. M. Enos	Visual Inspection of Steels
Mahoning Valley	Feb. 8	Y.M.C.A.	C. M. Parker	NE Steels
Milwaukee	Feb. 15	Milwaukee Athletic Club	I. R. Dawson	Aluminum Alloys
Montreal	Feb. 7	Queen's Hotel	C. E. Betz	Magnaflux
New Haven	Feb. 17	Derby Gas and Electric Co.	J. C. Morrison	High Speed Steel
New Jersey	Feb. 21	Essex House, Newark	A. H. d'Arcambal	How to Solve Machinability Problems
New York	Feb. 14	Bldg. Trade Employers Assoc.	C. E. Waring	Fine Metal Finishes and Their Protection During Manufacture, Shipment and Storage
North West	Feb. 3	Coffman Memorial Union, Univ. of Minn.	Gregory Comstock	Powder Metallurgy
Notre Dame	Feb. 9	Engineering Audit., Univ. of Notre Dame	W. E. Mahin	Cast Iron as an Engineering Material
Ontario	Feb. 4	Royal York Hotel, Toronto	Haig Solakian	Tool and High Speed Hardening in Salt Baths
Oregon	Feb. 11	Imperial Hotel	S. R. Kallenbaugh	Graphitic Steels
Philadelphia	Feb. 25	Franklin Institute	T. H. Nelson	
Pittsburgh	Feb. 10	Roosevelt Hotel	M. A. Grossmann	Hardenability of Steel and Effect of Alloys
Rhode Island	Feb. 2		Morris Cohen	Application of Theory to Practical Heat Treating
Rochester	Feb. 14	Rochester Chamber of Commerce	J. E. Callahan	Plastics
Rockford	Feb. 23	Faust Hotel	A. J. Langhammer	Machine Parts of Powder Metal
Rocky Mountain	Feb. 18	Oxford Hotel, Denver	R. Wayne Parcel	ASM Movie "Metal Crystals"
Saginaw Valley	Feb. 15	General Motors Inst., Flint, Mich.	G. D. Welty	Light Metal Forgings
Springfield	Feb. 21	Sheraton Hotel	George Stevens	Fabrication of Stainless Steels
Toledo Group	Feb. 28	Maumee River Yacht Club	Harry W. Smith, Jr.	Selective Mechanized Heat Treatment
Tri-City	Feb. 8	Hotel Ft. Armstrong, Rock Island, Ill.	Elmer Isgren	Fabrication by Arc Welding
Warren	Feb. 11	Y.W.C.A.	M. A. Grossmann	Principles of Heat Treatment
Washington	Feb. 14	Dodge Hotel, Garden House	T. G. Digges & S. J. Rosenberg	Iron-Carbon Alloys
West Michigan	Feb. 21	Rowe Hotel	Major David M. Warner	Magnetic Analysis
Worcester	Feb. 9	Mass. Steel Treating Plant		Flame Hardening
York	Feb. 9	West York Inn	Harry K. Ihrig	Silicon Impregnation

How the Mighty Can Fall!

Keen Kutter Knives were well and favorably known—once. They advertised extensively. They quit advertising. They quit everything else. Their "yesterday" advertising did no more for them than their last month's rent receipt did for them when the rent came around.

Packard Shoes, James Means Shoes, Queen Quality Shoes, Red Raven Splits, St. Jacob's Oil, "Who's Your Tailor, Ed V. Price", Piedmont, Old Judge and Duke's Cameo Cigarettes were tremendous sellers—once. They, too, quit advertising. General Arthur Cigars once had the big call all over the country. No more advertising. No more sales.

—V—

When you think of advertising, think of Metal Progress!

Shows Action of Electrons Vs. Photons in Microscopy

—Burton

Reported by A. S. Coffinberry
University of Notre Dame

Notre Dame Chapter—The replacement of photons by electrons in metallography presages both joy and grief for the metallurgist. Insofar as these two different types of particles behave like waves, the shorter wave length of electrons makes possible a much greater resolving power, sufficient to justify magnifications of the order of a hundred thousand. But in their behavior as particles, electrons do not rebound elastically, without loss of velocity, from the etched surface of a metal specimen as do photons when light is reflected.

According to Dr. E. F. Burton, head of the department of physics, University of Toronto, who addressed the December meeting on "The Electron Microscope and Its Applications", this characteristic of electrons as an imaging medium requires that the electron metallographer become skilled in the technique of preparing replicas of polished and etched surfaces. Photomicrographs are then obtained by means of a beam of electrons transmitted through the replica rather than by reflection directly from the metal surface.

Positive Replicas Made

A replica may be a "negative", consisting of a thin layer of such substance as collodion or formvar stripped off the metal surface after hardening in contact with it, or may be a "positive" formed from a negative.

One method of preparing a positive replica consists of molding polystyrene under heat and pressure to form a negative and then producing the positive by condensing vaporized silica on the embossed surface of the polystyrene.

Leading to an explanation of the theory of the electron microscope, Dr. Burton first reviewed in some detail the principles of physical optics involved in the functioning of the optical compound microscope and the ultra-microscope. He then traced the history of the appreciation of the dual nature of the electron (particle-like and wave-like) from DeBroglie's thesis of 1923 to the fruition of this knowledge as the perfected electron microscope.

Construction Shown

The dependence of resolving power upon wave length, in conjunction with the equation relating the wave length of electrons to the potential accelerating them, explains the high resolution obtainable.

A consideration of how electric and magnetic fields may act as lenses in deflecting and focusing electron beams introduced a discussion of the design and construction of electron microscopes. Starting with an electron source in place of a light source, a close analogy was shown to exist between electron and optical microscopes, with magnetic coils corresponding in position and function to condensing lens, objective, and projecting lens, or eyepiece.

Just as the ground glass of an optical metallograph serves alternatively with the photographic plate to enable either vivsual observation or photography, so a fluorescent screen functions in similar manner and position in the electron microscope. Differing from the path of light through a lens, however, the path of an electron through a magnetic coil is spiral.

Metallic Structures Shown

Results obtained with the electron microscope were interestingly illustrated by lantern slides which revealed a striking contrast between the best results of photomicrography by various optical methods and the much greater detail immediately apparent in electron photomicrographs.

Subjects treated included many familiar substances, organic and inorganic. Concluding the lantern slide series, like a dessert at the end, were examples of the electron photomicrography of metallic structures.

—V—

Hardenability, Effect of Alloys Given at N. Y.

Reported by W. A. Mudge
The International Nickel Co., Inc.

New York Chapter—A large and enthusiastic group assembled to hear Dr. Grossmann's lecture on "The Hardenability of Steels and the Effect of Alloys", which he gave on Dec. 13 to commemorate the Chapter's Annual President's Meeting.

Our genial friend and secretary, Bill Eisenman, was present also and many took advantage of his presence to offer sincere congratulations to him for the honors which the Society gave him last October.

Dr. Grossmann's lecture was interesting and unusually well delivered. He reviewed much of the work which led to the accepted mechanism of hardenability and its practical control. His logical presentation of the effect of alloying elements in steel, how each could be calculated and regulated so as to produce desired results, proved most enlightening to all, especially those whose major interest is in non-ferrous metallurgy.

A long and sometimes highly technical discussion followed the lecture and was participated in by more than half of the 125 members and guests present.

At the end, Bill Eisenman related many of his experiences during the early days of the Society and spoke also of the present and the future.

George K. Herzog, Electro Metallurgical Co., was the technical chairman.

Employment Service Bureau

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POSITIONS OPEN

METALLURGIST: For electric steel foundry in Utah. Experience in production of acid electric and induction furnace steel. Must be graduate of accredited school with experience in practical foundry operation and ability to take charge of research program on alloy and heat resisting steels. Excellent post-war future for good man. Box 12-35.

ELECTRONICS ENGINEER: For manufacturer of electric flaw detector for non-destructive testing of tubing and bar stock. Man self-trained in radio high frequency or television would be qualified. New Jersey. Box 1-5.

POSITIONS WANTED

SALES ENGINEER: Well established and intimately familiar with California territory, interested in representation of one or two additional eastern or mid-west manufacturers. Thoroughly experienced in sales development, in keeping customers satisfied and in meeting and solving customers' problems. Only first-class lines considered. Box 1-10.

QUALITY CONTROL METALLURGIST: Technically trained; age 40. Experienced in supervision of alloy steel manufacture; also in charge metallurgical inspection large airplane engine manufacturer; heat treat, X-ray, blacklight, Magnaflux and plating. Box 1-15.

METALLURGICAL AND CHEMICAL ENGINEER: 15 years' experience in both production and research; familiar with metallography, heat treating, and fabricating methods of aluminum, magnesium alloys and steel. Acquainted with processing practices used in aircraft manufacture. Draft 3-A. Desires permanent position on West Coast. Box 1-20.

PHYSICAL METALLURGIST: 41, Ph.D., with broad industrial and teaching experience, desires position involving teaching and research with recognized school planning for post-war period, or would consider research position with well-established firm. Box 1-25.

HEAT TREATER: Over 25 years' practical and technical training and experience with leading companies; metallurgical training. Supervisor, trouble shooter, practical demonstrator, teacher. Five years' steel selling experience. Box 1-30.

METALLURGICAL ENGINEER: Graduate; several years' practical experience in production problems, plant control, foundry and forging production. Research engineer in development and treatment of various metals, welding, and manufacture of weld rods. Has patented several methods of welding. Available within two weeks. Not subject to draft. Box 1-35.

DEVELOPMENT ENGINEER: Desires position in aircraft, automotive, refrigeration parts, or accessory field. 15 years' experience in mechanical and metallurgical engineering, product and tool design, development, testing, market analysis, manufacturing and sales. Age 39, draft exempt. Cleveland area preferred. Available Feb. 15. Box 1-40.

MECHANICAL ENGINEER: Graduate, acquainted with West Coast industrial accounts, desires connections with established manufacturers as manufacturers representative on industrial equipment or supplies for West Coast distribution. Box 1-45.

Three Welding Talks Feature Joint Meeting

Reported by H. A. Messner
Ohio Crankshaft Co.

Los Angeles Chapter—Three talks featured a joint meeting with the American Welding Society held at Scully's Cafe on Nov. 18. First was Miss Augusta H. Clauson, U. S. Office of Education, Washington, D. C., who spoke on "Women in Industry".

Miss Clauson's assignment was to investigate methods of training women welders and to determine why women leave such jobs. This she did by actually obtaining employment at Swan Island Shipyard in Portland, taking the training course, and working on construction of ships as a welder.

Harold Ewertz of Arcos Corp., Philadelphia, then presented considerable information on "Stainless Electrodes". Mr. Ewertz explained the difference in coatings and the application of stainless rods with different coatings to particular positioning to obtain specific results in the deposited metal.

He stressed the desirability of close cooperation between user and manufacturer in establishing the requirements of the deposited metal so that the proper rod might be selected.

The third speaker was V. W. Whitmer, stainless steel metallurgical engineer, Republic Steel Corp., Massillon, Ohio. Mr. Whitmer's talk on "Use of Stainless Steel in the Aircraft Industry and in the War Effort" was illustrated by numerous slides and followed by a fine movie of Republic's war work.

An interesting discussion developed on the effects of the stabilizing elements, columbium and titanium, on the high temperature properties of 18-8.

Chairman Alex Maradudin of the Los Angeles Chapter of American Welding Society presided at the meeting.

—V—

Future of Plastics Given

(Continued from page 1)

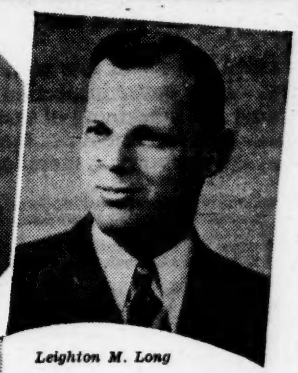
have, for instance in resistance to elevated temperatures. Certain of the plastics, however, have much superior corrosion resistance to the light metals.

During the discussion period, which was conducted by C. G. Stephens of the Glenn L. Martin Co., the comparative cost of plastics and metals was questioned, and was answered by an explanation of comparative production. For instance, cellophane, when first introduced, sold for approximately $3 per lb. but is now sold for approximately 30¢ per lb.

The hot forming of phenolic laminates, manufacture of disposable fuel tanks by low pressure laminating processes, injection molding of ethyl cellulose army canteens and injection molding of polystyrene storage battery cases were mentioned as new developments in the field of plastics.

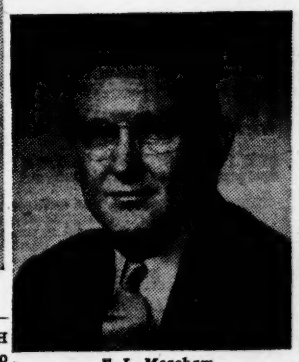
HERE AND THERE WITH A.S.M. MEMBERS

Ralph L. Wilson



Leighton M. Long

Marvin G. Sedam



F. L. Meacham

PAST National Trustee RALPH L. WILSON returned Jan. 1 to the Timken Roller Bearing Co., Canton, Ohio, as chief metallurgical engineer. He had been acting as chief of the Constructional Steels Section of the Metallurgical and Conservation Branch, Steel Division, of the War Production Board in Washington, D. C.

Mr. Wilson, who is 44, is a graduate of Lehigh University, where he received the degree of electrometallurgist.

His experience includes six years with the metallurgical departments of the United Alloy Steel Corp. and Central Alloy Steel Corp., after which he was for ten years employed by the Steel and Tube Division of the Timken Roller Bearing Co. as metallurgical engineer, specializing in alloy steel tubing applications in the various process industries.

He is well known for his work on the properties of metals at elevated temperatures and has contributed many articles to the literature on this subject.

He is also active in the affairs of the American Society for Testing Materials, the American Society of Mechanical Engineers, the American Petroleum Institute, and the American Welding Society.

• • •

MORSE HILL, member of the Executive Committee of the Dayton Chapter, has been transferred from Wright Field to the Eastern Procurement District, Army Air Forces, New York City.

• • •

A RECENT announcement from the Chicago Vitreous Enamel Product Co., Cicero, Ill., tells of the appointment of F. L. MEACHAM as manager of sales and service.

Mr. Meacham was formerly research chemist and metallurgical assistant at the American Rolling Mill Co., Middletown, Ohio, during which time he pioneered and developed sheet metal for the application of porcelain enamel.

More recently he has been with the Frigidaire Division of General Motors Corp. where he held various offices, the last of which was manager of the War Production Engineering Division, in full charge of all engineering problems in connection with the production of war items manufactured by Frigidaire.

• • •

LEIGHTON M. LONG has resigned as chief metallurgist and foundry superintendent of the Bunting Brass and Bronze Co., Toledo, Ohio, and moved to Columbus, Ohio, as an assistant research supervisor at Battelle Memorial Institute. Mr. Long is currently chairman of the Toledo Group of the Detroit Chapter, A.S.M.

Mr. Long received his technical education in Canada. His career began as a chemist and analyst, and he entered the metallurgical field in 1922, when he became associated with the Bohn Aluminum and Brass Co., Detroit.

He has served as a director of the Toledo Chapter and member of the Non-Ferrous Practices Committee of the American Foundrymen's Association; as a member of the Non-Ferrous Standards Committee of the Society for Automotive Engineers; and as a member of Committee B-10 of the American Society for Testing Materials. He is also a member of the American Institute of Mining and Metallurgical Engineers and the Detroit Engineering Society.

• • •

MARVIN G. SEDAM has been appointed director of research for the Alloy Rods Co., York, Pa. He will have complete supervision of new technical developments and materials control in the manufacture of stainless electrodes.

Mr. Sedam was formerly associated with the Harnischfeger Corp., Milwaukee, as chief metallurgist in charge of welding rod research and development.

—V—

At least 57 of the world's 92 chemical elements may be found in a modern steel mill.

Aircraft Material Selection Demands Ease of Fabrication, Assembly

—*Krivobok*

Reported by Lawrence K. Jetter
Metallurgist, Aluminum Co. of America

Pittsburgh Chapter—After an absence of three years, V. N. Krivobok, chief metallurgist of Lockheed Aircraft Corp., and a trustee of the A.S.M., returned "home" to speak on "Metallurgy in Aircraft" at the meeting on Oct. 14.

As a special treat, Dr. Krivobok presented an excellent sound and color movie of the "Flight Characteristics of the P-38" with the permission of the U. S. Army Air Forces. R. L. Templin, chief engineer of tests of the Aluminum Co. of America, acted as technical chairman.

In selecting materials for aircraft, the metallurgist must consider ease of fabrication and assembly as well as strength-weight ratio, Dr. Krivobok pointed out in his familiar inimitable manner.

New High Strength Alloy

Aluminum alloys are still the predominant material. Among the latest developments is XA75S, an alloy considerably superior in strength to 24S, the one now most widely employed. The strength of 24S itself has been markedly improved by use of new artificial aging treatments.

Another recent development is Rey-Met, a duplex material of the alclad type in which a strong alloy is employed as the coating instead of pure aluminum. The strength is thereby increased and the resistance to corrosion is claimed to be retained.

Where formerly aluminum alloys were nearly always formed in the annealed temper, now, with improved techniques, many parts are formed after heat treatment, thus eliminating much distortion.

Magnesium Shot Blasted

Wrought "high strength" magnesium alloys in aircraft involve certain difficulties since they exhibit low ductility and fatigue strength and are susceptible in various degrees to stress corrosion. Furthermore, forming must be done hot.

Inducing compressive stresses in the surface layers by shot blasting, however, has effected remarkable increases in fatigue strength and resistance to stress corrosion.

Although steels with strength-weight ratios comparable to those of the light metals have been developed, they have not been widely emp'oyed because of the inherent instability of thin sections.

A single design should not be employed in judging the performance of the various aircraft materials, Dr. Krivobok warned, for different materials may require different designs to reveal their intrinsic characteristics.

Syracuse Chapter Plans Study of Handbook

The Syracuse Chapter plans to have a study course after the first of the year using the A.S.M. Metals Handbook as a textbook. It is felt that many metallurgists are not getting the most out of their handbook because of a lack of knowledge of what material is contained therein, and of the best methods of finding the information which is desired.

The course will start with a general lecture on the organization of the book, followed by further talks on particular subjects which will be found to be of the greatest interest to the members.

Answers to Quiz

(See Page 3)

1. *(c)* The American steel industry is expected to produce close to 90,000,000 tons of steel in 1943.
2. *(a)* One out of every three of the number of steel workers employed in August 1940 is now in service.
3. *(b)* Steel mills last year cut their accident rate to 7.4 per million man-hours worked; one per cent below the 1941 figure.
4. *(b)* 100,000 tons of ingots are required to build and equip a big battleship. The steel industry produces about 1,750,000 tons per week.
5. *(b)* Nearly one-fourth of total rail freight in 1942 was carried to or from steel plants.
6. *False.* Women fill a wide variety of steel plant jobs such as crane operators, rolling mill helpers, machine tool and heating furnace operators.
7. *(a)* It takes more than five months to process main belt armor for battleships.
8. *True.* In 1935 Adirondack mines produced 300,000 gross tons of ore. Last year the total was well in excess of 3,000,000 tons.
9. *(c)* 4,400 tons of raw materials are needed to make 1,000 of steel plates.
10. *True.*

Guide to Metallurgical Books

BECAUSE it is impossible to carry in one's head all the details of his industry, a well-rounded library of reliable data is a definite asset. Not only does it save his time, but it often makes his available knowledge of a subject more accurate and up-to-date.

You can assemble such a library from the books listed below—at low cost. These books include reliable information on every phase of the metal industry. They cover inspection of metals . . . strength of metals . . . modern steels . . . alloying elements . . . forging . . . machining of metals . . . hardenability . . . carburizing . . . stainless steels . . . physical testing . . . heat treatment . . . tool steels . . . quenching . . . grain size . . . working of metals . . . age hardening . . . pyrometry . . . metallographic technique . . . etc.

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Res. Laboratory, U. S. Steel Corp.

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Edited by John Wulff, Department of Metallurgy, Massachusetts Institute of Technology

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by Gordon T. Williams, Metallurgist, Deere & Co., Moline, Ill.

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N. J. Course On Heat Treat Is Popular

Reported by R. L. Rickett
U. S. Steel Corp. Research Laboratory

New Jersey Chapter—While the subject of the first educational lecture series of the season, "The Heat Treatment of Steel," is by no means new, it was felt that there is always need for helpful fundamental information on this subject. The consistently good attendance at these lectures, ranging from 150 to 185 persons, is ample evidence that the need is greater now than ever. A special appeal was made to women to attend the meetings and a number did so.

Much of the credit for the splendid attendance at these lectures should go to W. C. Schulte who presented the first four of the series and C. W. Hasemann who gave the fifth and last lecture. Mr. Schulte, chief metallurgist of the Propeller Division, Curtiss-Wright Corp., is a former instructor in metallurgy, which may account for the very excellent job he did in organizing and presenting his material.

His lectures covered the structures of steel and their practical significance, time and temperature effects in heat treatment, heat treatment of the engineering steels, and case hardening treatments.

C. W. Hasemann, chairman of the New Jersey Chapter, was "drafted" to present the final lecture on "Tool Steels and Their Heat Treatment," a subject with which he is particularly familiar as a result of his work as tool steel metallurgist, Hyatt Bearings Division, General Motors Corp.

An appropriate motion picture preceded each lecture and mimeographed notes, covering the essence of each talk, were presented to those attending. The Educational Committee, which consists of F. P. Peters, chairman, and Messrs. J. A. Kearny, W. H. White, R. J. Metsler, P. E. Schweizer and A. Bornemann, is to be commended for arranging a well-integrated and much-needed series of lectures.

A second group of lectures, which will be a continuation of the first and will deal with such things as heat treating methods, equipment, etc., is to be presented in the spring.

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Reducing the number of sizes of automobile batteries now being made from 100 to 17 has saved almost 16 million lb. of secondary lead, over 17 million lb. of primary lead, and over 1¼ million lb. of secondary antimony.

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